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The Cystic Hyperplasia-Pyometra Complex in the Bitch

BY

C. DOW

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SUMMARY.—A survey of 100 cases of the pyometra complex is given with the following subdivision on a histological basis:—

Type I. *This comprised 23 cases of uncomplicated cystic hyperplasia. The mean age was 7.1 ± 2.4 years and the lesion was present at all stages of the cycle. The only symptom was a mucoid discharge during metoestrus.*

Type II. *In 17 cases, there was a diffuse plasma cell infiltration superimposed on cystic hyperplasia of the endometrium. Vaginal discharge was the only consistent symptom. The mean age was 7.2 ± 1.9 years and the lesion was found between 40 and 70 days post-oestrus. Slight leucocytosis was present.*

Type III. *Forty-nine per cent. of the series showed an acute endometritis superimposed on cystic hyperplasia. These animals were clinically ill; the degree of illness varied with the distension of the uterus and the extent of myometrial reaction. The average age was 8 ± 2.2 years and the lesion occurred 30 ± 14 days after oestrus. There was a leucocytosis with counts of 19,000 to 145,000 per cu. mm.*

Type IV. *Eleven per cent. of the animals showed a chronic endometritis. The degree of illness varied inversely with the patency of the cervix. The average age was 11.8 ± 1.7 years and the lesion was found between 55 and 90 days post-oestrus. Total white counts varied from 16,000 to 68,000 per cu. mm.*

A review of methods of treatment and of the aetiology is given.

The experimental reproduction of the first 3 types of the cystic hyperplasia-pyometra complex is reported.

THOUGH pyometra denotes an accumulation of pus in the uterus, the term is now generally used to describe a post-oestral syndrome of the adult bitch associated with variable clinical and pathological manifestations of genital disease. The condition has been described under a variety of names such as hydrometra, pyometritis, catarrhal endometritis, purulent metritis, chronic cystic endometritis, chronic sub-involution, and many others. All these names have their merits but since they only describe one feature of the disease, they lead to needless confusion. To suggest that the term "pyometra" should be reserved for cases showing marked retention of pus is illogical since it is well known that spontaneous cervical relaxation may occur in closed cases and, conversely, closure may occur in open cases. Histologically, there is frequently no differential feature between open and closed cases. Since cystic glandular hyperplasia of the endometrium is found in a high percentage of cases, a plea has been made for the use of the term "hyperplastic endometritis" (DeVita, 1939; Low, 1954). This ignores the fact that this hyperplastic reaction need not be associated with inflammatory change and that many chronically affected uteri may show no hyperplasia. In this communication, the term "pyometra complex" is retained since I believe that empyema of the uterus is not an isolated condition but is only one stage in a series of pathological changes.

This report is based on the clinical and pathological examination of 100 bitches of which 79 were presented as clinical cases of genital disease and the remainder are from a survey carried out in the course of routine *post-mortem* examinations. The series has been divided into 4 major groups, purely on a histological basis though it will be seen that clinical findings justify this to a considerable extent. A summary of the experimental production of the first 3 groups is presented. Detailed pathological descriptions will be given in later publications.

Group I

In these 23 cases, the basic lesion of cystic glandular hyperplasia of the endometrium is seen without any

superimposed inflammatory reaction. The uteri were larger and more rounded than the normal ribbon-like structure. The endometrium was hypertrophied and was lined by a variable number of clear cysts of up to 1 cm. in diameter. Commonly, the cysts were scattered evenly throughout the length of the uterus but sometimes they were localised to the upper ends of the horns.

E. coli was isolated from the uterine mucus of 6 cases which were in metoestrus: bacteria were absent at other stages of the cycle.

Histologically, there is an absolute increase in the number of glandular elements with cystic change which varied in degree with the stage of cycle (Fig. 1). There is no cellular infiltration of any layer of the uterine wall.

The animals ranged from 3 to 12 years of age with a mean of 7.1 ± 2.4 years. From Table I it is seen that only 6 cases were under 6 years of age. Of the 23 bitches, 15 were nulliparous and 7 had whelped 3 to 8 years previously. In the remaining case, a 12-year-old bitch, no litter had been born in the 6 years it had been in the owner's possession. Of the parous animals, 6 had had a single pregnancy and the other had whelped twice. Since the animals were examined at all stages of the cycle, it is evident that cystic hyperplasia is not a cyclic phenomenon.

TABLE I

Age	Type I	Type II	Type III	Type IV
3	1	0	0	0
4	2	0	1	0
5	3	2	3	0
6	4	4	6	0
7	4	5	6	0
8	3	4	10	0
9	1	0	7	1
10	3	1	9	1
11	1	1	2	3
12	1	0	2	3
13	0	0	3	1
14	0	0	0	1
15	0	0	0	1
16	0	0	0	0

It was ascertained that 15 of these animals had shown some evidence of sexual abnormality before admission. Irregular occurrence of oestrus had been present in 5 bitches over a period of 1 to 4 years. The interval between any 2 consecutive oestrus periods varied from 3 to 10 months, but in no case was this interval consistent over a number of cycles. In 4 bitches there had been abnormal duration of pro-oestrus and oestrus which was extended to 30 days or more or was abbreviated to as little as 5 days. In some cases, bleeding persisted throughout the entire pro-oestrus and oestrus, whilst in others, the only evidence of sexual activity was slight vulval oedema and attraction for males. It is of interest to note that 6 of these bitches had shown distinct signs of phantom pregnancy. Two were admitted as possible cases of dystocia but pregnancy was ruled out and they proved to have typical cystic hyperplasia with highly secretory epithelium.

Systemic upset referable to genital disease was absent in every case. There was a mucoid vulval discharge from the 11 in metoestrus but not at any other stage of the cycle. In 2 cases, the discharge was sufficiently profuse to cause the owners to desire treatment. Vulval oedema was absent except in those in early metoestrus and in the cases of phantom pregnancy.

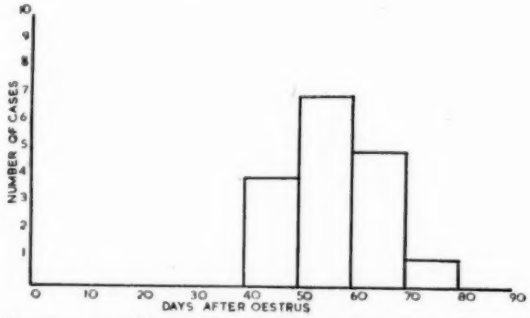
Examination of vaginal smears revealed differential cell counts which were consistent with the stage of cycle except in a few anoestrus animals which showed smears suggestive of early pro-oestrus. It is probable that the latter were coming into pro-oestrus before the expected time. Haematological examination failed to detect relevant changes. Uterine enlargement was detected by radiography following pneumo-peritoneum only in oestral and metoestral bitches.

Group II

There were 17 cases in this group. The uteri showed considerable hypertrophy but the horns rarely exceeded 2 cm. in diameter. The uterine wall was thickened, particularly the endometrium, which was lined by irregular cysts and by polypoid proliferations of the dull greyish stroma. The cervix generally showed some degree of patency and the uterine lumen rarely contained more than 20 c.c. of a clear, relatively acellular, mucoid fluid. No bacterial growth was obtained from 3 of these uteri and the remainder yielded *E. coli*.

Histological examination of the endometrium shows a marked cystic hyperplasia with diffuse stromal infiltration by plasma cells concentrated in the crypt and sub-epithelial zones. Evidence of tissue destruction, fibroblast activity, and cellular exudation into the glands as seen in human plasma cell endometritis is absent. Because of this, there is doubt if this is inflammatory in origin and it has been named, provisionally, plasma cell endometriopathy.

The ages of the group varied from 4 to 11 years with a mean of 7.2 ± 1.9 years (Table I). Pregnancy had not occurred in 13 bitches and the other 4 had had single pregnancies 5 to 9 years previously. Plasma cell endometriopathy was found only in animals between 40 and 70 days after oestrus (Graph 1). All but 5 had shown irregularities in their sexual cycles.



GRAPH 1.—Incidence of stage of cycle of cases of cystic glandular hyperplasia with superimposed plasma cell infiltration.

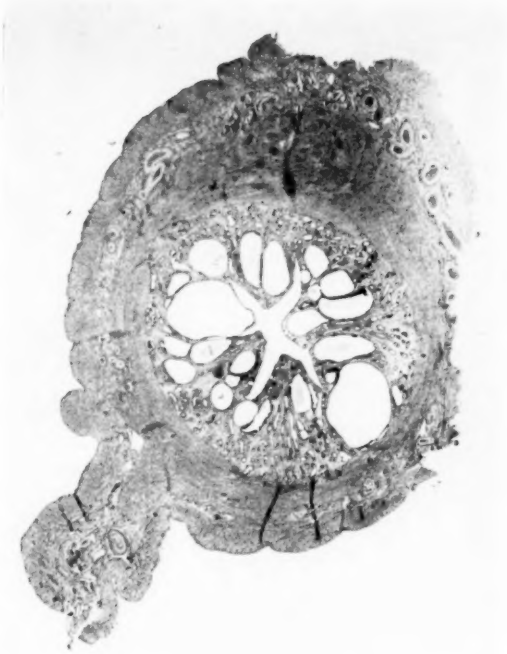


FIG. 1.—Mild cystic glandular hyperplasia of the endometrium. H. and E. ×8.

FIG. 3.—Acute endometritis superimposed on cystic glandular hyperplasia. H. and E. ×110.

FIG. 2.—Marked cystic glandular hyperplasia of the endometrium. H. and E. ×8.

FIG. 4.—Squamoid metaplasia of the superficial epithelium in chronic endometritis. H. and E. ×110.

The intervals between cycles had varied considerably in 5 animals and 3 had shown abnormal duration of oestrus. Phantom pregnancy had been observed in 4 bitches; 1 had shown signs after every cycle for 3 years.

All were discharging a variable amount of glairy, mucoid fluid which, in many cases, had persisted for several weeks. Vulval oedema was a frequent sign. Only 2 animals showed some degree of anorexia and malaise which was referable to abdominal distension. Radiography always revealed some uterine enlargement.

Examination of vaginal smears showed that the epithelial cells were not cornified and many of them were of the small variety. A few polymorphs were present in some cases but haemal cells were generally absent. Occasionally, there were rectangular mucin-containing cells, presumably of uterine origin.

The erythrocyte counts and haemoglobin concentrations were normal but most dogs showed a mild leucocytosis with total white counts of 12,000 to 15,000 per cu. mm. The differential white cell counts were usually within normal limits.

Group III

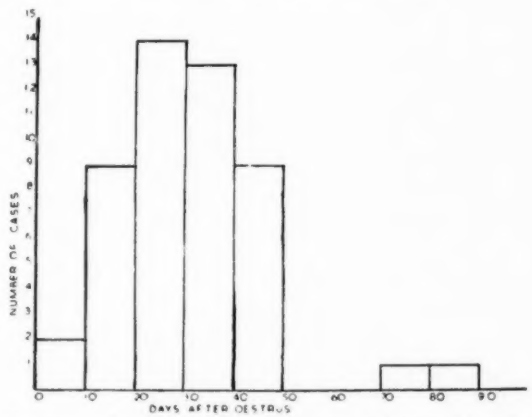
The characteristic lesion found in 49 per cent. of the series was an acute inflammatory reaction of the endometrium superimposed on a variable degree of cystic hyperplasia. The size of the uterus was inversely proportional to the degree of patency of the cervix. Uteri, weighing up to 3 or 4 kg., and with horns measuring 50 cm. long and up to 7 or 8 cm. in diameter, were not uncommon in 15- to 20-kg. bitches. The horns were of almost uniform diameter in some cases but more often they exhibited a number of annular constrictions producing a series of irregular ampullae. Unilateral distension was present in 3 cases with cystic hyperplasia in the contralateral horn. The uterine fluid varied in colour from yellow to green but it was often tinged reddish-brown with blood. The viscosity of the fluid varied with the degree of haemorrhage, being highest where the pus was of a greenish or yellow colour. Massive haemorrhage was not observed in any case but small focal haemorrhages were often numerous. The uterine wall was hypertrophied except where there was gross distension. The endometrial surface had a roughened appearance with mingling of smooth, pus-filled cysts, focal haemorrhages, and areas of ulceration. Complete closure of the cervix was observed in 8 cases and, in many others, there was only a narrow orifice which had allowed discharge of but a fraction of the fluid.

On cultural examination, only 5 cases failed to yield organisms. Of the remainder, all but 4 yielded *E. coli*, 6 yielded a coagulase-positive staphylococcus, and 5 contained a β-haemolytic streptococcus. It is important to note that 6 with completely closed cervices and 2 unilateral cases were infected.

Histological examination reveals a polymorphonuclear infiltration of the endometrial stroma, particularly intense in the superficial crypt zone (Fig. 3). In more advanced cases, the reaction extends to the deeper layers of the endometrium and abscesses are frequently formed round blocked glands. In 40 per cent. of the uteri examined, there is evidence of extension of the inflammatory process to involve the myometrium. In one case, which died of an acute peritonitis, complete perforation of the uterine wall by endometrial ulcers is present at several points.

The members of this group were from 4 to 13 years of age with an average age of 8 $\pm$ 2.2 years. Of the 49 animals, 38 were nulliparous and the remainder had whelped 5 to 11 years prior to the onset of illness. Only 3 were multipara; 2 had been pregnant twice, and the third had whelped 4 times. No breeding or oestral history was obtained in 3 cases.

The average interval between oestrus and examination was 30 $\pm$ 14 days and, though the range was 5 to 80 days, it is significant that 77 per cent. of the animals were presented in the first 40 days post-oestrus (Graph 2). Fourteen animals had previously shown irregularities in duration of oestrus or of the time between oestrus periods. One bitch could not be classified in this group of oestral irregularities since she had shown regular, normal oestrus periods once a year for 10 years. Phantom pregnancy had been observed at least once in each of 5 bitches. There was a history of discharge and sometimes periods of inappetence after previous cycles in 7 cases.



GRAPH 2.—Incidence of stage of cycle of cases of acute endometritis.

It was commonly found that the duration of the present illness was from 4 to 10 days, rarely longer. Vulval oedema was present in most but vaginal discharge was visible in only 38 cases on admission. It was ascertained that discharge was intermittent in approximately one-third of the group. Several had never discharged whilst others had discharged for a few days and had then ceased with subsequent increase in severity of symptoms. Listlessness and anorexia were evident in all except one animal which showed little general upset. Increased thirst had been noted in 32 cases and 21 had vomited at some time during the course of the illness. It was sometimes noted that vomition occurred only at the start of the illness when inappetence was first observed and did not occur again. Vomiting was most frequent and most severe in the presence of gross uterine distension.

Some degree of abdominal distension was seen in 40 cases, usually accompanied by increased tension of the abdominal muscles except in prostrated animals. Diarrhoea was not a common symptom, being observed in only 4 cases. In 38 cases, the temperature was within normal limits, in 8 it was from 103° to 104.5° F., and in the remaining 3 it was under 100° F. Subnormal temperatures were associated with high operative mortality. The severity of the illness showed a direct correlation with the degree of distension and with the degree of myometrial involvement.

Leucocyte counts ranged from 19,000 to 145,000 per cu. mm. In cases where discharge was absent, the total white count was always over 50,000 but very high figures were also present where there was marked myometrial extension of the acute inflammatory process. The leucocytosis was always due to increase in the number of neutrophils, of which up to 35 per cent. were immature forms, mostly non-lobulated with a few myelocytes. In some cases, abnormalities were evident in the morphology of the neutrophils, particularly in the non-lobulated forms which exhibited cytoplasmic basophilia and, occasionally, cytoplasmic vacuolation. There appeared to be increased cellular fragility as evidenced by large numbers of " smudge " cells. In many non-lobulated neutrophils, supravital staining revealed a decrease in the number of cytoplasmic granules. Anaemia was not observed.

The erythrocyte sedimentation rate was constantly accelerated to between 10 and 55 mm. per hour and was of prognostic significance. Rates of more than 30 mm. per hour were associated with high mortality or slow post-operative recovery.

Plasma urea levels were determined as a routine. The average level was 33 ± 9 mg. per 100 ml. with a range of 21 to 119 mg. It was found that levels of 65 mg. per 100 ml. or more warranted a guarded prognosis and were poor operative risks.

Examination of vaginal smears revealed almost entirely polymorphonuclears with a few non-cornified epithelial cells. In closed cases, the percentage of neutrophils was less but there was no difficulty in differentiating from the normal early metoestrus smear.

In many cases, radiographical diagnosis was simple, but in those with ampulla formation, it was often impossible to distinguish pyometra and mid-pregnancy on a purely radiographical basis.

Group IV

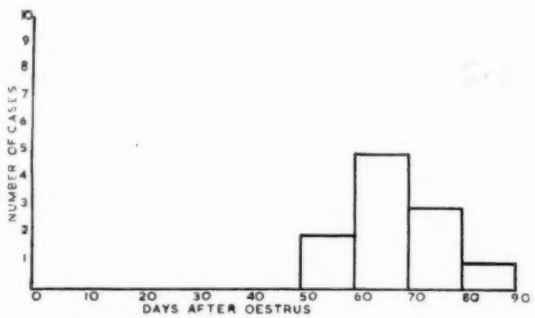
The smallest group, totalling 11 animals, consists of cases of chronic endometritis. The cervix was either sufficiently open to allow adequate drainage or was completely closed, so that 2 distinct pathological and clinical sub-groups were apparent. Where the cervix was patent, the uterine horns were rarely more than 3 cm. in diameter, the walls were thickened, and the lumen contained only a small amount of muco-pus. In those with cervical closure, extreme distension of the uterus was present with paper-thin walls in which normal structural features were unidentifiable.

Histological examination of the " open " cases reveals myometrial hypertrophy and fibrosis. The endometrium is atrophied, the glandular structures are few, and the stroma shows fibrosis and infiltration by lymphocytes and a few plasma cells. In closed cases, the endometrium was atrophied to such an extent that only a few collagen fibres separate the myometrium from the superficial epithelium. Glands are rare, though a few may be seen penetrating the myometrium. The endometrial epithelium is frequently showing squamous metaplasia (Fig. 4). The myometrium is atrophic with elongation of muscle fibres and loss of staining affinity.

Bacteriological examination revealed no growth in 2 cases, *E. coli* in 8, *Staphylococcus aureus* in 2, and a β-haemolytic streptococcus in 2.

The mean age of the group was 11.8 ± 1.7 years with a range of 9 to 15 years. Of the 9 animals in which breeding and oestral history was available, only 2 had been pregnant. Both had whelped twice over 6 years previously. There was a history of post-oestral genital disease in 9 cases. All were presented in the period 55 to 90 days post-oestrus (Graph 3).

Clinical sub-division was clear cut. In the open cases, only discharge and slight inappetence were observed. The closed cases were seriously ill with increased thirst, frequent vomition, and prostration. No correlation was found between the degree of illness and age or time after oestrus. Skin changes were common in both types. The skin was dry and inelastic, with areas of alopecia on the flanks, over the abdomen, and on the perineal region.



GRAPH 3.—Incidence of stage of cycle of cases of chronic endometritis.

Total white cell counts ranged from 16,000 to 21,000 in the open cases and from 31,000 to 68,000 in the closed cases. The leucocytosis was due, largely, to neutrophils but in some cases, bizarre mononuclears accounted for up to 7 per cent. of the total. These cells had irregularly stellate nuclei containing relatively little chromatin arranged in a loose monocyte-like fashion. The cytoplasm was a dull blue with occasional vacuoles in it. No cytoplasmic granules were present on supravitally stained smears. These " star cells " have been observed in other chronic conditions in the dog. Anaemia was not seen in any of these bitches. The erythrocyte sedimentation rate varied from 8 to 40 mm. per hour, being highest in closed cases.

The blood urea levels varied from 29 to 47 mg. per 100 ml. and did not appear of diagnostic significance.

Examination of vaginal smears revealed a variable neutrophil exudation in addition to normal epithelial cells.

Radiography was used to confirm the diagnosis.

Ovary

No mention has been made of ovarian pathology in the individual groups because there was no evidence of lesions specific to any of the types of endometrial lesion. It is important to note that corpora lutea were present in all clinical cases. In animals of more than 30 days post-oestrus, the corpora lutea rarely showed the degree of regression expected for the stage of cycle. This was particularly evident after 50 days post-oestrus and it is probable that persistence of the corpora lutea is of pathogenetic significance. Of the 100 animals, the ovaries of 23 showed proliferation of the tubules of the rete ovarii, 19 contained follicular cysts, and 8 contained granulosa cell tumours. All of these ovarian lesions have been associated with endometrial hyperplasia in one species or another but as yet there is little evidence that they are significant in the bitch. All are found in the absence of uterine change.

Treatment

Despite the many therapeutic trials of various hormones, ovaro-hysterectomy remains the treatment of choice. Lesbouyries and Berthelon (1935) proved that ovariectomy produced relief in 5 to 15 days. This approach would not appear of great practical value since the response is too slow for those cases in which degree of illness demands less radical surgical interference than pan-hysterectomy. In prostrate animals, marsupialisation gives rapid relief without a major surgical operation. Details of surgical technique are adequately described in other works and I will not discuss them further.

If the known actions of the various sex hormones are correlated with what has been learned of the aetiology of pyometra, it is difficult to see any rationale for hormone therapy. It appears logical to infer from the work of Lesbouyries and Berthelon (1935) that ovarian hormones are contraindicated since removal of the ovaries results in complete and permanent cure of the condition. Since it has been proven in a variety of experimental animals that the action of gonadotrophin is mediated through the ovaries and that they exert no direct effect on the uterus, there seems little justification for their use. There are, however, reports of success with hormonal therapy and such evidence must be weighed against the known variations in the pathological processes present in the uterus.

Stilboestrol found favour in the decade after its discovery, since it was purported to cause relaxation of the cervix and improve the tone of the uterus. There is no conclusive evidence that it produces cervical relaxation in the metoestrus bitch though profuse discharge has been observed in some cases after its use, with and without subsequent pituitrin injection. It is difficult to envisage any improvement in muscle tone in those cases showing marked inflammatory reaction of the myometrium. In addition, the dog is very sensitive to the toxic effects of both natural and synthetic oestrogens. If surgery is necessary after failure of stilboestrol therapy, operative bleeding due to thrombocytopenia is a major hazard.

Progesterone, by direct action on the endometrial epithelium, increases its secretory activity. It also inhibits relaxation of the cervix. Both these actions are undesirable in cases of pyometra, whether open or closed.

Since the action of the gonadotrophins are mediated through the ovary, their actions are essentially those of the ovarian hormones whose production they initiate.

It has been shown in rodents and in dogs that testosterone causes atrophy of the secretory cells of the ovary. This action is too slow to be of use in acute cases but it would probably be effective in chronic discharging cases which show little systemic upset and which often show temporary response to antibiotic therapy. It is possible that, with the use of implants, endometrial regression may be sufficient to prevent recurrence after subsequent cycles but therapeutic trials are essential to evaluate the use of testosterone.

Aetiology

In the present survey a number of factors are common to all groups and, therefore, would appear to be of aetiological significance. (a) The mean age of 100 cases is 8.2 years and though the range is 3 to 15 years, only 12 per cent. are under 6 years of age. (b) Only 27 per cent. of the bitches had whelped and only 7 per cent. were multiparous. This does not necessarily indicate a high incidence of sterility since details of mating were usually unobtainable. There is some evidence that pregnancy delays the onset of cystic hyperplasia and pyometra, particularly where several litters have been produced, but the series is too small to be conclusive. (c) It is significant that all clinical cases were in the period 5 to 80 days after oestrus, *i.e.* in the luteal phase of the cycle. (d) It is evident that there is some correlation between oestral irregularities, phantom pregnancy, and the pyometra complex. Irregularities of the oestral cycle were recorded in 33 per cent. of the animals examined and 15 per cent. of the total had exhibited signs of phantom pregnancy at least once. (e) Bacteria were isolated from uterine fluid in 84 per cent. of the clinical cases. No organism was specific for any one type of endometritis.

Until 1935, it was generally accepted that pyometra was of bacterial origin. Keller (1928) believed that various pyogenic bacteria, particularly streptococci, were the causative organisms. Möller-Sorensen (1929) found *B. coli* to be the most frequent pathogen. Bacterial infection was believed to occur at oestrus when the cervix was open or by a retrograde lymphatic route from the colon. The possibility of venereal transmission with subsequent foetal death

was also suggested. As the variety of bacteria isolated increased, it became obvious that no aetiologic specificity could be given to any of them.

Final proof that bacteria were not the only factor involved in the genesis of pyometra was afforded by the comparative failure of experimental bacterial reproduction. Lesbouyries and Berthelon (1935) and Teunissen (1938) reported rare instances of organisms which would produce endometritis on experimental introduction into the uterus. In no instance was the natural condition duplicated. Modern opinion (Rieck, 1956) is that certain factors are necessary to predispose the uterus to bacterial infection.

In 1935, Hetzel, using large doses of oestrone over a considerable period, reproduced a mild form of cystic hyperplasia in spayed and intact bitches. He inferred that natural cystic hyperplasia was due to hyperoestrinism. Since pyometra is the commonest complication of cystic hyperplasia, he deduced that pyometra was a further manifestation of hyperoestrinism. Despite the discovery of a very high percentage of pyometra cases with corpora lutea (DeVita, 1939; Kostner, 1942), this conception has dominated views on the aetiology of the condition since Hetzel's report. Erichsen (1952), by a series of assumptions, has extended the hypothesis to include those cases which exhibit corpora lutea.

Though experimental hyperoestrinism has produced pyometra in rodents, it has failed to do so in the dog, and the hypothesis appears untenable in the light of present knowledge.

Teunissen (1952) studied the effects of oestradiol and of progesterone on the endometrium of normal and ovariectomised bitches of 1½ to 5 years old. Even after 60 days treatment with oestradiol, only mild hyperplasia of the glands was observed. In 15 bitches treated with progesterone in doses of 10 to 50 mg. daily for 20 to 60 days, 14 showed moderate hyperplasia of the superficial and glandular epithelium with superimposed inflammatory changes in 7 of them. Withdrawal of progesterone caused regression of the inflammatory and hyperplastic changes.

Despite the lead given by Teunissen's work, no report of the reproduction of an endometritis exhibiting the clinical and pathological characteristics of pyometra has been published.

Experimental Reproduction of the Cystic Hyperplasia-Pyometra Complex

In the following experiments, ovariectomised bitches of 1 to 1½ years were used. A period of 30 days was allowed to elapse between ovariectomy and commencement of hormone injections. The experiments were divided into the following sections:—

(1) The animals in this group received daily injections of 1, 5, 10, 20, or 30 mg. of stilboestrol dipropionate or its equivalent of oestradiol monobenzoate for periods of up to 60 days. Doses of more than 1 mg. per day proved fatal in 11 to 45 days. The histological picture was that of pro-oestrus or of oestrus with considerable oedema and stromal haemorrhage. Glandular hyperplasia was mild even after 60 days treatment.

(2) Similar experiments were carried out using progesterone; previous endometrial sensitisation with oestrogens was not employed. The daily dosage of progesterone ranged from 10 to 100 mg. Very slight changes were produced by the lower dosage levels but all showed some evidence of secretory activity. The complexity of the superficial epithelial proliferation increased with the length of treatment. In cases receiving 50 and 100 mg. of progesterone per day for 40 to 60 days, stratification and polypoid outgrowths were evident in the superficial epithelium. Occasional small foci of neutrophils were visible in the stroma of the crypt zone.

(3) The animals in this group were sensitised with 5 or 10 mg. of stilboestrol per day for 10 or 20 days before commencing treatment with progesterone. Progesterone was given in doses of 10, 20, or 50 mg. daily for 10, 20, 40, or 60 days. The histological changes differed only in degree from those obtained by progesterone alone. The surface epithelium and glands showed enhanced proliferative and secretory activity. Only a few inflammatory foci were present in those cases receiving prolonged progesterone treatment.

(4) Artificial cycles of the type described in section 3 were repeated several times with and without periods of rest between cycles. Cycles of 50 or 100 mg. of stilboestrol given over 10 days followed by 10 mg. of progesterone per day for 20 days could be repeated up to 10 times without evidence of inflammatory change though cystic hyperplasia was present from the third cycle onwards. If, during the fifth or sixth cycle, the daily dose of progesterone was increased to 25 mg., all the typical symptoms of pyometra became evident. The uterine horns were enlarged to approximately 3 or 4 cm. in diameter, and histological examination revealed typical acute endometritis superimposed on cystic glandular hyperplasia. The superficial epithelium was hyperplastic and the crypt zone was infiltrated with neutrophils and plasma cells as in the Type III lesion of the natural disease. If the progesterone level was 25 mg. from the first cycle, mild, inflammatory changes were apparent after the third cycle, and progressive enlargement of the uterus occurred with each subsequent cycle.

These experiments are still in progress and will be reported fully at a later date.

Discussion

The disparity between my results and those of Teunissen are probably accounted for by the difference in age of the bitches used. Teunissen's animals were 1½ to 5 years old as against 1 to 1½ years in my experiments. It is evident from the present survey that the former are within the cystic hyperplasia age range and therefore it is likely that they would respond more readily to artificial hormonal stimulation. This appears to be borne out by the need for at least 3 artificial cycles in young bitches to achieve the mild inflammatory reaction obtained by Teunissen.

From my experimental findings, it appears that the level of oestrogen and the type of oestrogen are not critical in the production of Type I and Type III

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Induced Drug-fastness to Nitrofurazone in a Laboratory Strain of *Eimeria tenella*

BY
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SUMMARY.—1. After 9 passages in chicks treated continuously with 0·01 per cent. nitrofurazone in the food a strain of E. tenella *was shown to have developed drug-resistance.*

2. The nitrofurazone-fast strain responded normally to treatment with either sulphaquinoxaline or sulphadimidine.

Introduction

THERE are two conditions which appear to be necessary for the development in protozoa of resistance to drugs. These are the constant or repeated administration of the drug and the use of a dose which fails to suppress completely the growth of the organism (Schnitzer & Grunberg, 1957). Both these conditions exist where coccidiostatic drugs are given in preventive treatment to flocks of domestic fowls maintained under intensive conditions. The development of drug-fast strains is therefore a risk which ought to be assessed.

The work of Cuckler and Malanga (1955) in the United States has suggested that the risk does exist under field conditions, when they obtained evidence that a high proportion of field strains of Eimeria failed to respond normally to treatment with either nitrophenide, sulphaquinoxaline or nitrofurazone.

In Great Britain the drug nitrofurazone has been widely used and flocks of domestic poultry very commonly are given this drug continuously as a preventive measure against Eimeria infections. So far there has been no data available on the way in which drug-fastness develops in *E. tenella* under continuous treatment with this drug. In order to observe this phenomenon a series of experiments, which was briefly referred to by Kendall, Davies & Joyner (1956), has been carried out at Weybridge in the course of which a strain of *E. tenella* has been passaged in chicks receiving 0·01 per cent. nitrofurazone continuously in the food.

Materials and Methods

White Leghorn or Rhode Island Red chicks, aged 8 to 10 days, were used for the experiments. They were kept in wire-floored cages and allowed unlimited food and drink. In order to isolate the resistant strain from other work with *E. tenella*, the infected chicks were kept in a small heated room with an independent ventilation system and double doors. The attendants changed their overalls and washed their boots on entering and leaving.

Oocysts were separated from caecal tissue on the eighth day after infection by homogenising the caeca in 2 per cent. potassium bichromate solution and extracting the oocysts by salt flotation. The oocysts were allowed to sporulate in 2 per cent. potassium bichromate and stored at +5° C.

Nitrofurazone was used as a commercially available premix. The diet consisted of a standard chick mash and the drug was incorporated with the aid of a mechanical mixer.

In the experiments to assess the sensitivity of strains of *E. tenella* to drugs, groups of 10 to 15 chicks were infected with sufficient oocysts to kill the majority of untreated birds. Each group was kept in a separate cage and the different concentrations of drugs were administered either in the drinking water or in the food. Nitrofurazone was given in the food either for 3 days commencing 48 hours after infection or for 5 days commencing at the time of infection. The sodium salts of sulphaquinoxaline and sulphadimidine were administered in the drinking water for three days commencing 48 hours after infection.

The Development of Drug-fastness

In the attempt to induce drug-fastness, *E. tenella* was serially passaged in chicks receiving 0·01 per cent

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The Cystic Hyperplasia-Pyometra Complex in the Bitch.—*Concluded.*

lesions. The hormone determining the initiation and, possibly, the extent of inflammatory change is progesterone. This is in keeping with the consistent finding of active corpora lutea in clinical cases. Withdrawal of progesterone causes regression of the artificial lesions; similarly, ovariectomy causes regression of clinical cases (Lesbouyries & Berthelon, 1935). From preliminary work, the Type II lesion appears comparable with the lesion seen some 15 to 20 days after withdrawal of progesterone. This is compatible with the fact that the Type II lesion is commonly found after 40 days post-oestrus.

There is, as yet, no experimental evidence to link the chronic lesions with those in the other groups but it is possible that they develop after a number of acute attacks as the history suggests. A lesion similar in most respects to Type IV was produced by ligating of the uterus and then subjecting the animal to several artificial cycles.

Acknowledgments.—This work was carried out in the Hospital Pathology Unit under the supervision of Dr. W. F. H. Jarrett.

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nitrofurazone continuously in the food. The chicks were infected with a dose of oocysts estimated to permit the survival of the birds and to provide an adequate yield of oocysts when the chicks were sacrificed on the eighth day after infection. The oocysts recovered from the caeca were used to infect another group of chicks and so obtain a further yield of oocysts for the next passage. The oocysts were always harvested on the eighth day in order to select those parasites which developed normally rather than those which were retarded by the drug treatment. In this way it seemed likely that a larger proportion of resistant parasites, unaffected by the drug, would be selected.

Initially, doses of 50,000 oocysts were given, and although the resulting infection was incompletely suppressed, caecal haemorrhage was only slight and all the chicks survived until the eighth day. Similar infective doses were given until the sixth passage when caecal haemorrhage appeared to increase and it was necessary to reduce the infective dose to 10,000 oocysts in order to ensure the survival of the chicks. At the ninth passage, 7 out of 30 chicks died from acute caecal coccidiosis resulting from this relatively light infection despite continuous treatment with 0·01 per cent. nitrofurazone. When this passage was repeated using doses of 5,000 oocysts, 6 out of 48 chicks died but no deaths occurred when 2,000 oocysts were given.

It seemed likely that some degree of drug-fastness had developed and a series of experiments therefore was designed to assess the changes which had occurred in the sensitivity of this strain of *E. tenella* to nitrofurazone.

The Assessment of Drug-fastness

From time to time at different stages in the series of passages, the sensitivity of the parasites to nitrofurazone was tested. The results of these experiments are recorded in Table I. At each stage a comparison was made with a normal strain of *E. tenella* against which 0·024 per cent. nitrofurazone (NFZ) showed a marked suppressive effect. After eight passages under continuous treatment with this drug, however, Table I shows that 0·024 per cent. nitrofurazone (NFZ) failed to control the disease. At the ninth passage even 0·048 per cent. NFZ which was the maximum that could be given without undue toxic effects failed to reduce the mortality.

From these results it seemed likely that an appreciable degree of drug-resistance had developed but because nitrofurazone, even under normal circumstances, cannot always be relied upon to control *E. tenella*, especially against heavy infections (Davies & Kendall, 1955) further confirmatory experiments were carried out.

Nitrofurazone often gives better control of *E. tenella* when administered before the parasites become established and in the experiments recorded in Table II the drug was given for 5 days commencing at the time of infection. Under these conditions 0·024 per cent. of nitrofurazone reduced the mortality due to infection with the normal strain but against the drug-fast strain there was again no demonstrable therapeutic effect.

Yet further evidence for the development of drug-resistance is provided by the experiment recorded in Table III. Cultures of oocysts obtained at different stages in the series of passages under nitrofurazone treatment had been stored at +5° C. and in the experiment recorded in Table III the sensitivity of several of these cultures to nitrofurazone was tested simultaneously. The results confirm that by the ninth passage the strain was appreciably resistant to 0·024 per cent. nitrofurazone in the food given for 5 days from the time of infection. The sixth passage appeared to react normally to the drug. Control of the eighth passage, however, appeared to be reduced, as shown by a higher mortality than in the controls at both treatment levels, which is in agreement with the results obtained with this culture given in Table I.

Cross-resistance to Sulphonamides

It is of great practical importance to establish whether resistance to nitrofurazone also involves cross-resistance to other coccidiostatic drugs, especially to the sulphonamides which are still the most efficient therapeutic drugs. The experiments were therefore continued with the aim of increasing the degree of drug-resistance and then testing the drug-fast strain against other drugs. Accordingly, the nitrofurazone-fast strain was given 8 further passages ; 2 in chicks under treatment with 0·015 per cent. nitrofurazone in the food and a final passage in chicks receiving 0·02 per cent. of the drug.

In the experiments recorded in Table IV the strain finally obtained was tested against sulphaquinoxaline, sulphadimidine and nitrofurazone at doses known to be

TABLE I

THE SENSITIVITY TO NITROFURAZONE (NFZ) OF A STRAIN OF *E. tenella* AFTER PASSAGES IN CHICKS TREATED WITH 0·01 PER CENT. NITROFURAZONE IN THE FOOD, COMPARED WITH A NORMAL STRAIN

Each group of chicks received the drug in the food for 3 days commencing 48 hours after infection

Number of passages under treatment with NFZ	Number of deaths									Number of chicks per group
	Resistant strain Concentration of NFZ in food					Normal strain Concentration of NFZ in food				
	0·048 per cent.	0·024 per cent.	0·012 per cent.	0·006 per cent.	Nil	0·024 per cent.	0·012 per cent.	0·006 per cent.	Nil	
IV	—	1	2	6	7	8	10	9	12	12
VII	—	0	4	12	13	3	6	7	12	15
VIII	—	11	12	11	9	3	8	7	9	15
IX	10	8	7	—	8	3	4	9	6	10

TABLE II

THE EFFECT OF NITROFURAZONE (NFZ) ON A NORMAL STRAIN OF *E. tenella* AND ON THE DRUG-FAST STRAIN

The drug was given in the food for 5 days from the time of infection

Experiment	Number of deaths						Number of chicks per group
	NFZ-fast strain passage IX Concentration of NFZ in food			Normal strain Concentration of NFZ in food			
	0·024 per cent.	0·012 per cent.	Nil	0·024 per cent.	0·012 per cent.	Nil	
A	6	6	6	2	3	6	10
B	14	12	13	5	5	13	15

effective against normal strains. The drug-fast strain again showed its reduced sensitivity to nitrofurazone but its reactions to the sulphonamide treatments were exactly the same as those of the normal strain. There was therefore no evidence for cross-resistance to these sulphonamides.

TABLE III

THE EFFECT OF NITROFURAZONE ON A STRAIN OF *E. tenella* AT DIFFERENT STAGES DURING A SERIES OF PASSAGES IN CHICKS TREATED WITH 0·01 PER CENT. NITROFURAZONE

The drug was given for 5 days commencing at the time of infection

Passage number	Mortality Concentration of nitrofurazone in the food		
	0·024 per cent.	0·012 per cent.	Nil
VI	2	4	9
VIII	5	8	9
IX	9	8	7
Normal strain	2	2	8

Ten chicks per group

Discussion

The field as well as the laboratory demonstration of fastness to nitrofurazone is complicated by the fact that this drug is not a highly active coccidiostat (Davies & Kendall, 1955) and its effects are not easily demonstrated against the lethal infections which are necessary for precise work in the laboratory. Examples of this are to be seen in Table I (passage IV) and in Table IV (Experiment B) where the mortality in the untreated groups was high and unusually poor control was obtained with nitrofurazone. It has been necessary therefore to base the evidence for drug-fastness on repeated experiments in which a number of different doses of the drug were used. The range of doses which could be used was severely limited by the toxicity of the drug and therefore the detectable reduction in its effect was small. Under these circumstances the experiments were not sensitive enough to indicate whether the drug-fastness to nitrofurazone developed suddenly or gradually. It is clear, however, that the drug-fastness was established by the ninth passage and it was probably present in some degree at the eighth passage.

The observation that nitrofurazone-fast *E. tenella* was not resistant to sulphonamides suggests that such strains may still be treated with either sulphaquinoxaline or sulphadimidine. It also confirms the conclusion reached by Kendall & Joyner (1956) that nitrofurazone exerts its coccidiostatic effect by some mechanism not directly related to the p. aminobenzoic acid-folic acid metabolic chain, which is the main site of action of the sulphonamides.

The experiments recorded in this paper have established that *E. tenella* may react to constant treatment with nitrofurazone by a reduction in sensitivity. To establish the importance of this phenomenon under practical conditions it must be demonstrated that strains of the organism recovered from the field have a similar reduced sensitivity and fail to react to the normal therapeutic or prophylactic effects of the drug. This has been attempted in the United States where Harwood & Stunz (1953) first examined a number of field strains

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TABLE IV

A COMPARISON OF THE EFFECTS OF SULPHAQUINOXALINE, SULPHADIMIDINE AND NITROFURAZONE ON THE NORMAL AND NITROFURAZONE-FAST STRAINS OF *E. tenella*

Experiment	Strain of *E. tenella*	Mortality Number of chicks dead per group of 10			Control mortality. Number of chicks dead per group of 10
		Sodium sulphaquinoxaline 0·0645 per cent. in water Day 0 + 2 to 0 + 5	Sodium sulphadimidine 0·2 per cent. in water Day 0 + 2 to 0 + 5	Nitrofurazone 0·02 per cent. in food Day 0 to 0 + 5	
A	NFZ-fast XII	2	0	5	5
	Normal	1	0	1	9
B	NFZ-fast XII	1	0	6	7
	Normal	1	0	5	9
C	NFZ-fast XII	1	0	5	7
	Normal	3	0	1	9

Current Literature

BOOK REVIEWS

Proceedings of the Third National Cancer Conference. Philadelphia and Montreal: J. B. Lippincott Company, 1957. Pp. 961. £3 12s.

This is a record of papers given at a conference on cancer in man, held in Detroit in June, 1956. Although Dr. Gellhorn, one of the participants, speaks of "those hardy and probably fictitious characters who read Proceedings published one to three years after the meeting," the reviewer has found this volume to be of immense interest. It is important reading matter for all concerned with cancer research, but as an account of how matters stand in the fight against cancer, it contains much material that is of wider biological and general interest.

The book comprises 6 general lectures, and reports of symposia dealing with the incidence, development, diagnosis, and treatment (including surgery, radiotherapy, chemotherapy, and hormone therapy), and other related aspects of certain very important forms of human cancer—of the breast, prostate, lung, cervix, alimentary tract, and haemopoietic and lymphopoietic systems particularly. The general lectures are concerned with: (i) Epidemiology as a tool in cancer research; (ii) Radiation neoplasia; (iii) The virus aetiology of cancer—Wendell M. Stanley adduces evidence in support of his belief that "the time has come when we should assume that viruses are responsible for most, if not all, kinds of cancer, including cancer in man, and design and execute our experiments accordingly"; (iv) Chemical effects of growing tumours on the host, with special reference to iron—this is concerned with the decrease of liver catalase levels in experimental animals bearing tumours; (v) Factors influencing the curability of cancer—a wise discussion by F. W. Stewart of the importance of early diagnosis (early, in respect of size, duration, and extent of the cancer); (vi) The measurement of morbidity—showing the pitfalls, and means of avoiding them, in assessing the incidence of a particular disease.

The kind of subjects dealt with in the symposia can perhaps best be illustrated by some selected titles of papers: "Some factors involved in the incidence of breast cancer"—marital status, number of children, lactation history, and so on. While "human studies appear to be generally consistent with the interpretation of a hormonal factor" being involved in the aetiology of breast cancer, there is a need "for epidemiologic study of breast cancer, integrated with clinical laboratory studies of the endocrine status" of affected and normal women. This would also hold true for mammary neoplasia in the bitch. "Natural history of prostatic cancer"—particular reference is made by Dr. Franks to his studies of latent or unsuspected cancer—"at least 30 per cent. of all men over 50 years of age have histologic cancers in their prostate." "Pharmacological alterations of adrenalcortical function in man: Amphenone and related compounds"—depressing thyroid and adrenal function in both normal and hyperfunctional states, and even (with respect to the adrenal gland) in neoplastic states. "Hypophysectomy in metastatic cancer of the breast." "Hypophysectomy in palliation of prostatic cancer." "Radiation as a factor in human lymphomas and leukaemia." "On the virus aetiology of leukaemia"—in mice: a most important advance in cancer studies. "Mechanisms of resistance to cancer chemotherapy agents." "Smoking and lung cancer: A review"—this paper, by M. L. Levin, should be read by smokers and by non-smokers. "Studies on tobacco smoke condensate." "Changes in the bronchial epithelium in relation to smoking and cancer of the lung: Progress report." "The epidemiologic approach to the problem of gastric cancer."

The concluding portion of the book deals with end results of treatment of cancer of the various sites discussed in the other chapters. In some fields, hopeful advances are being made, but in others the prognosis is still very grave.

It is very difficult, if not in fact impossible, for the specialist worker to keep up with current progress in the field of cancer studies by reading original papers, and *a fortiori* the non-specialist reader must rely more and more on reviews and similar surveys. Conferences of this kind have a double function—they are firstly of importance to the actual participants, from the lively cross-fertilisation of ideas that takes place in any well-run conference, and, secondly, the proceedings when published help to keep a much wider circle in touch with the advancing edge of knowledge. Although this book contains only one

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Induced Drug-fastness to Nitrofurazone in a Laboratory Strain of *Eimeria tenella*.—*Concluded.*

of *E. tenella* and failed to find evidence of drug fastness. Two years later, however, Cuckler & Malanga (1955) basing their observations mainly on oocyst production, found that 57 per cent. of their field strains of poultry coccidia, including *E. tenella*, failed to react normally to the drug. So far as is known, similar investigations have not been attempted in Britain. There is, nevertheless, a clear need for more information on the incidence and physiology of drug resistance in poultry coccidia.

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paper of direct veterinary interest—that by J. W. Beard on the nature of the virus of avian myeloblastosis and erythroblastosis—veterinary workers who read it with the second function in mind will find it full of interest.

The Infectious Disease of Domestic Animals with Special Reference to Aetiology Diagnosis and Biologic Therapy. WILLIAM ARTHUR HAGAN, D.V.M., D.SC., and DORSEY WILLIAM BRUNER, D.V.M., PH.D. Third edition (1957). London: Baillière, Tindall & Cox. New York: Comstock Publishing Company. 84s.

The third edition is 48 pages longer than the second, and although the text has been rewritten and a considerable amount of new material has been added, the general plan has been retained. There is also included a new chapter on infectious diseases of unknown or uncertain aetiology, together with a few new illustrations. Some of the photographs could be more informative, and some omitted without loss.

The book is again very well produced, and it is very readable; but unfortunately there are some obvious omissions. In the chapter on chemotherapy there is very little about resistance to antibiotics, or about sensitivity tests which are most essential in chemotherapy. In the section dealing with viral diseases, enzootic (virus) pneumonia of pigs is not mentioned, although the disease is now generally recognised. It is difficult to understand why diseases such as infectious canine hepatitis and enzootic fox encephalitis, which are caused by the same virus are discussed separately. The same is true of infectious feline enteritis and virus enteritis of mink.

In order to justify the title of the book it should contain a little more information on pathology, epidemiology, and control of infectious diseases. In spite of these criticisms this is an excellent book for the student and still remains the best available.

Phosphorus and Fluorine. B. C. SAUNDERS (1957). (Cambridge University Press.) Pp. xvi, 232. 23 Figs. Price 32s. 6d.

The bare title of this book would not go far to explain its being reviewed in a veterinary journal, but its sub-title, "The Chemistry and Toxic Action of Their Organic Compounds" clearly indicates a subject which might well be of concern to those whose interest and duty it is to care for animals.

In his preface Dr. Saunders says that his book is primarily for chemists, but "the inter-relationships of chemical constitution with biological activity have always been kept in mind." To that end he has tried, as consistently as lucidity of presentation will allow, to separate the more purely chemical matter from the biological sections. From the point of view of most veterinary readers, this is naturally an advantage.

It is doubtful, not only that the book would have been written, but that most of the work it summarises would ever have been done at all, if the early tests, with which Dr. Saunders was associated, had not revealed results of very grave significance. Many compounds necessary for the normal metabolism of birds and mammals contain phosphorus, whilst a few fluorine compounds are at least non-toxic, but around the year 1940 a group of substances, which contain both elements and which are extremely toxic, was discovered almost simultaneously in Germany and in England. As war gases they had very disturbing potentials, far above that of some of the previously known agents. Fortunately they were not used, but they gave rise to much research into their chemistry and physiological significance. In the end they have proved to be of use in clinical medicine, in the formulation of rodenticides and insecticides, and in studies of the relationship of enzymes to the transmission of nervous impulses.

Of the 10 chapters of the book, the first gives an historical introduction to the subject (20 pp.), whilst the second is devoted purely to the chemical nomenclature of phosphorus compounds (7 pp.) and is followed by a brief chapter (14 pp.), intended mainly for chemists, dealing with the mammalian nervous system. Chapter IV is a long one describing the chemistry and physiology of the phosphorofluoridates (45 pp.) and is followed by a brief section telling of another very toxic group of phosphorus and fluorine derivatives. Chapter VI is almost entirely concerned with relevant chemical details of certain phosphorus esters (19 pp.), but the following chapter, dealing with fluoroacetates, hardly has a single one of its 35 pages where the relationship of chemical constitution to physiological activity is not under discussion. Here will be found reference to the fact that Nature is no less skilful than man, even in a field so largely concerned with toxicity: a South African plant, which naturally contains potassium fluoroacetate, is so poisonous that half of one leaf is a lethal dose for an ox. Chapter VIII (21 pp.) also discusses the chemistry and pharmacology of organic fluorine compounds, whilst the penultimate chapter is concerned with insecticides derived from the elements phosphorus and fluorine. Lastly the esterase activities and medical aspects of these substances are interestingly outlined in the 19 pages of Chapter X.

A group of appendices deals with the determination of fluorine, with the properties of fluorine compounds and with first-aid treatment for nerve-gas poisoning. A general bibliography and a good index of 13 pages end the book.

The printing and general production are excellent, whilst the author's style is lucid and easy to read. A minor flaw, a small amount of repetition concerning the origin of some of the information contained in the monograph, probably arises from the fact that the book represents the expansion of a series of lectures.

Although many veterinary surgeons may find some of the chemistry not to their special taste, there is a great deal of interesting biology in it which is not to be found elsewhere. Those whose interest lies in the fields of anaesthesia, or of intermediary metabolism, or who are concerned, directly or otherwise, with insecticides or rodenticides, ought to read the relevant sections.

Animal Health Trust Research Station Opened by the Duke of Edinburgh

THE new farm livestock research station of the Animal Health Trust, an account of which appeared in our last issue, was declared open by the Duke of Edinburgh at a well-attended ceremony last Friday. In introducing His Royal Highness the Duke of Norfolk, President of the Trust, said:—

"It is my privilege, this afternoon, to welcome you, Sir, to this research station, and to thank you most sincerely for coming. It is only some 20 months ago that I had the privilege of laying the foundation stone, and as this is the first sight since that day that I have had, it seems remarkable that so much has happened in these few months. We are, of course, most indebted to many people including the Boreham Trust and the late Lord Perry, and therefore we are assembled here in the hopes of seeing another station created for the benefit of the future of the livestock of this country, which is one of our heritages. To you, Sir, I would say that the interest you have shown, and are showing, in all the spheres of agriculture for this year is remarkable—President of the Royal, President of the Dairy Show, President of Smithfield, and your presence here this afternoon speaks not a little for that interest and we are indeed grateful to you for having come.

"I would ask Your Royal Highness to be kind enough to declare this station open."

The Duke's Speech

The Duke of Edinburgh then declared the station formally opened in the following words:—

"There are three reasons why I am very pleased and delighted to be able to visit, open, and look round these Animal Health Trust laboratories. As you have just heard I do not believe in half measures, and so I am President of the Royal Agricultural Society, President of the British Dairy Farmers Association, and President of the Smithfield Show, and all of them are vitally interested in the health of farm animals. It also gives me an opportunity, in the capacity of President of these three organisations, and also in my personal capacity, to express our admiration and appreciation of all the work that is done by the Animal Health Trust in all their laboratories in different parts of the country for the domestic animals of this country and, of course, for animals all over the world.

"The third reason is because I am, personally, quite interested in farming and livestock generally, and also because I am fascinated by all kinds of research. I like to see these ingenious techniques that are used to solve rather complicated problems. I like the atmosphere in a research establishment—the pleasure and excitement whenever some useful bit of work has been achieved after a great deal of hard work. I believe that in this world where we think that we know everything and we think that we can do everything it is sometimes good for the soul to be reminded how much we do not know, and one of the best places to find out is in a research laboratory.

"In this place there will be plenty to do: prevention of disease and sickness and suffering in animals, and also help for agriculture in the commercial sense. Disease in farm livestock is supposed to cost farmers something like 70 million pounds a year, and so any investigation into disease and methods of cure and prevention is of the first importance. But there is an enormous gap between actual sickness on the one hand and what one might describe as vigorous health on the other. There are all sorts of things in that gap. Infant mortality amongst human beings is something like 2 per cent.; in farm livestock it is anything between 15 and 20 per cent. That is not actual disease, but it is also not good health. Then there is infertility; that is not necessarily a disease but there is something not exactly right, and in farm livestock in this country it is becoming rather a problem. A great many farm animals are becoming worn out sooner than they ought to—their productive life is not as long as it used to be. We do not know why strange things happen when we change the diet. We know something that happens but we do not know other things that happen. We do not know how the treatment of feeding-stuffs with different things will affect the people who eat the animal products. I hope these and many other things will be investigated in the capable hands of Dr. Sellers and his helpers in these laboratories. I am quite sure they will soon be responsible for many, I hope, fruitful developments.

The Duke of Edinburgh at the opening ceremony. On the right of the picture is Dr. Wooldridge, and on the extreme left Dr. Sellers, the director of the Station.

"I would also like to add my appreciation of the work and support that is being given to this effort by the Boreham Institute, and their generosity, and I hope for their sakes also we may see some fruitful developments.

"Now, ladies and gentlemen, it gives me the greatest pleasure to declare this laboratory open, and if someone will lend me a key I will unlock it."

The Trust's Scientific Director, Dr. W. R. Wooldridge, responded to the Duke's speech. He said:—

"After such a stimulating speech I feel that the least we can do for the future of animal research and the benefit of the agricultural world is to persuade Prince Philip to join the scientific staff of the Animal Health Trust. He has shown that perspicacity, understanding and enthusiasm that are needed so much in research to-day. I thank you, Sir, most sincerely, not only on behalf of the scientists in the Animal Health Trust but also on behalf of scientists everywhere who keenly appreciate all you are doing in the interests of scientific endeavour all over the world.

"All I can do in conclusion in thanking you, Your Royal Highness, is to say that you continue to set an example of service and humanity on behalf of the community which we in the Animal Health Trust are doing our best to emulate in our own field of humanitarian work in the interests of both man and animals.

"Prince Philip, I thank you most warmly for the great interest you are taking in these new laboratories, and in the work of the Trust."

His Royal Highness was then shown round the station.

Among the many guests who accepted invitations to the ceremony were:—

Mr. J. M. Ingram, President of the B.V.A.; Colonel Sir Francis Whitmore, Lord Lieutenant of Essex; The Duke of Devonshire, Hon. Treasurer of the Animal Health Trust; The Lord Rank, Chairman of the Executive Committee of the Animal Health Trust; Sir Alfred Wood; Mr. G. E. Shrimpton; Dr. A. W. Stableforth; Mr. Francis S. Gentle, Member of Council and Member of Executive Committee of the Animal Health Trust; Mr. G. N. Gould, President of the R.C.V.S.; The Lord Stamp; Mr. J. K. Knowles, Secretary of the National Farmers' Union; The Earl of Northesk; Dr. F. A. Cooper, Director of the Cooper Technical Bureau; Mr. Wm. C. Miller; Sir Stanford Cooper and other Trustees of the Boreham Institute; Sir Alexander Glen, Secretary, Department of Agriculture for Scotland; Dr. W. S. Gordon; Mr. S. F. J. Hodgman; Captain F. K. J. Peel, Chief Constable of Essex; Dr. D. E. Wheeler, Managing Director, Wellcome Foundation; Mr. C. P. Quick; Mr. W. G. R. Oates, Registrar of the R.C.V.S.; Mr. A. D. Self, President, Essex Veterinary Society; Mr. R. Massey, Secretary, Essex Veterinary Society; members of the Essex County Committee of the Animal Health Trust; Dr. Montgomerie, Burroughs Wellcome; Dr. N. S. Barron, Agricultural Food Products; Professor W. L. Weipers; Professor J. McCunn; Professor L. P. Pugh, Cambridge University; Dr. E. L. Taylor, and Professor W. I. B. Beveridge.

News and Comment

THE FARMERS' CLUB DINNER

The Farmers' Club dinner was held on Tuesday evening, December 3rd, the principal speaker being the Prime Minister.

Among the official guests were the President of the B.V.A., Mr. J. M. Ingram, Mr. G. N. Gould (President of the Royal College of Veterinary Surgeons) and Mrs. Gould, the Registrar, Mr. G. W. R. Oates and Mrs. Oates, and Mr. J. N. Ritchie (Chief Veterinary Officer) and Mrs. Ritchie who attended on behalf of the Ministry of Agriculture.

R.C.V.S. LIBRARY

In order to have as few books as possible in the post during the Christmas rush no parcels will be despatched from the Library after Tuesday, December 17th, until after the holiday. Urgent requests will be dealt with, however, if they are marked urgent.

The College will close at noon on December 24th and re-open on Monday, December 30th, 1957.

ELECTION OF MEMBERS OF THE R.C.V.S. COUNCIL

The following Statutory Notice is published at the request of the Royal College:—

In accordance with the provisions of the Veterinary Surgeons Act, 1948, five members of the said Council, who must be members of the Royal College, will be elected in 1958 by members of the Royal College residing outside the Republic of Ireland.

Five present members of Council will retire at the Annual General Meeting in 1958 and are eligible for re-election, namely:—

A. J. Wright, Esq.
Professor C. Formston.
J. F. D. Tutt, Esq.
Miss J. O. Joshua.
H. Holroyd, Esq.

Nominations of persons for election to the Council must be submitted in writing on a form which may be obtained from the undersigned, and which must be returned to him duly completed before January 31st, 1958.

Each such nomination form must bear the signature of the proposer and seconder, who must not be present members of Council, and must be countersigned by the nominee.

W. G. R. OATES,
Registrar.

Veterinary Surgeons Acts, 1881-1948

9, Red Lion Square,
London, W.C.1.

R.S.M. SECTION OF COMPARATIVE MEDICINE

The notice of members is drawn to a meeting next Wednesday, December 18th, of the Section of Comparative Medicine of the Royal Society of Medicine. It is to take place at the Society's House at 5 p.m.

and the programme will be as follows: Dr. H. Smith on *The Basis of Immunity to Anthrax*, Mr. E. C. Hulse on *Strain 19 and other Brucella Vaccines*, and and Dr. J. Ungar on *Immunisation Studies with Freeze-dried B.C.G.*

STANDARD VETERINARY CERTIFICATE FOR CASUALTY ANIMALS

The Farm Livestock Committee of the B.V.A. has recently been attempting to draw up a standard form of veterinary certificate to accompany casualty animals to slaughter-houses. With this in view the matter has been discussed between representatives of the Fatstock Marketing Corporation and the B.V.A. and it has been ascertained that the following form of certificate would meet requirements:—

VETERINARY CERTIFICATE FOR CASUALTY ANIMALS

1. Owner's Name..... ..... 2. Date.....
Address .....

3. Description of Animal .....
.....

4. Nature of Disease or Injury (this excludes existence of scheduled disease) .....
.....
.....

5. Details of any Medicine or Drugs which to my knowledge have been administered and which might be harmful to the carcase.
.....
.....

6. Is the animal or carcase suitable for dressing and submission for inspection for human consumption .....
.....
Signature of veterinary surgeon.....
Address .....
.....

This form of certificate is approved by the British Veterinary Association.

The Fatstock Marketing Corporation has sent a copy of this certificate to each of its Area Offices with the recommendation that they should ask veterinary surgeons to use this form as from January 1st, 1958.

Arrangements have been made with Messrs. H. R. Grubb Ltd., Poplar Walk, Croydon, Surrey, to print these certificates in pads of 100 certificates each, with duplicates, for sale to members at the following prices, which include purchase tax and postage: With the member's name and address printed, £1 7s. 6d.; without name and address, £1 2s. 6d.

UNIVERSITY NEWS

Edinburgh

The undermentioned candidates have passed the Final Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery: Kingston, John Brian; McLean, Alexander McGregor; Mair, John Harvey; and Watt, Robert Duncan.

IN MEMORY OF PROFESSOR G. H. WOOLDRIDGE

Further contributions to the Victoria Veterinary Benevolent Fund have been received from:—

Mr. H. W. J. Adams, Colonel G. Barnett, Messrs. A. J. Beeson and J. D. Blaxland, the British Veterinary Association, Lt.-Col. G. N. Bushman, Messrs. H. E. Bywater, Eoghan Clark, H. W. Dawes, G. N. Gould, H. F. C. Hebeler, and S. L. Hignett, Mr. and Mrs. A. E. Hunt, Messrs. Ivor Hughes, J. McC. Ingram, S. Jennings, F. V. John, and L. E. Perkins, Miss L. H. H. Phillips, and Messrs. Archibald Sutherland, Alex Thomson (Glasgow), and A. J. Wright.

The total received is £115 13s. 0d.

VETERINARY WORK TELEVISED

A veterinary surgeon is to make several appearances in the B.B.C. television broadcasts for farmers, which were begun a short time ago. The next such appearance will be on December 19th when the subject will be calving a cow. A film showing the birth will be included. The time of the programme, of which this feature is a part, is 12.30 p.m.

LEGAL NOTE

On Tuesday, December 10th, 1957, 17 summonses taken out by the Royal College of Veterinary Surgeons against Mr. C. Dean, an employee of the National Canine Defence League, under Section 5 of the Veterinary Surgeons Act, 1948, were heard at Lambeth Magistrates Court.

Counsel, on behalf of the College, accepted a plea of guilty on 4 of the charges and the remainder were not proceeded with. The Magistrate recorded a conviction on each charge and imposed a nominal penalty of 5s. on each, together with 25 guineas costs. A fuller report will appear in our next issue.

CLASSIFIED ADVERTISEMENTS AND NOTICES

Will readers kindly note that owing to the exigencies of printing over the Christmas holiday, classified advertisements and Notices intended for publication in our issue of December 28th must reach us not later than the first post on Wednesday morning, December 18th. It will be impossible to publish material received after that date until our issue of January 4th, 1958.

AN ACKNOWLEDGMENT

Arising from the article Birth of an Indian Rhinoceros Calf at Whipsnade, which was published last week, we are asked to mention that the hormones administered to the male animal were given by Messrs. Organon Laboratories Ltd., London.

PERSONAL

Births

BLANCHARD.—On November 28th, 1957, to Diana, wife of J. H. Blanchard, M.R.C.V.S., D.V.S.M., Leominster, Herefordshire, a son.

CAMPBELL.—At Selkirk on November 6th, 1957, to Carroll, wife of Robin J. Campbell, B.SC., M.R.C.V.S., D.T.V.M., of the Department of Animal Health, P.O. Box 97, Tamale, Ghana, West Africa, a son, Colin McRobert.

HIME.—On November 21st, 1957, to Valerie (*née* Cochran) and Malcolm Hime, M.R.C.V.S., 14, Cornwall Gardens, Braintree, a son, John Richard.

PALMER.—On November 28th, 1957, to Shirley, wife of R. H. F. Palmer, B.SC., M.R.C.V.S., of Hathersage, Bowbridge Lane, Stroud, Glos., a daughter, Sarah Denise.

RICHARDSON.—On December 5th, to Gweneth Mary, wife of John Richardson, M.R.C.V.S., Horizon View, Stratton, Bude, a daughter, Christine Anne.

WILKINS.—On November 22nd, 1957, to Margaret (*née* Hyatt) and Geoffrey Wilkins, MS.R.C.V.S., of Crewkerne, Somerset, a son, Roger Cyril.

Engagement

ELLIS—COLEMAN.—The engagement is announced between Mr. Frank Butterworth Ellis, PH.D., B.SC., son of Mr. and Mrs. John Ellis of Greenbank, Giggleswick, Yorkshire, and Irene Nancie Louise Coleman, younger daughter of Mr. and Mrs. Ivan Coleman of Friar Street, Reading, Berks.

Marriage

KNEEN—ROBERTS.—At All Saints' Church, Church Lawton, Cheshire, on November 16th, 1957, by the Rector, The Rev. I. T. Wilson, John Edwin Kneen, B.V.SC., M.R.C.V.S., son of Mr. and Mrs. T. Kneen of Isle of Man, to Maureen Roberts, daughter of Mrs. F. G. Roberts and the late Mr. J. E. Roberts of Church Lawton.

Dr. W. R. Wooldridge was admitted as an Assistant to the Court of the Farriers' Company at a Court meeting held on December 10th. The last member of the profession to be a member of this Court was the late Professor Buxton, who became Warden of the Company. Dr. Wooldridge is also a member of the Court of the Farmers' Company.

COMING EVENTS

December

19th (Thurs.). Annual Dance of the V.V.B.F. Ladies' Guild, Dumfries and Galloway Division, in the Cairndale Hotel, Dumfries, 8.30 p.m.

Ordinary General Meeting of the South-Eastern Veterinary Association at the Royal Star Hotel, Maidstone, 2.30 p.m.

20th (Fri.). 9th Annual General Meeting of the A.V.T. & R.W.'s. Southern Region at the Royal Veterinary College, Camden Town, N.W.1, 12 noon.

January

8th, 9th and 10th (Wed., Thurs. and Fri.). R.C.V.S. Committee and Council Meetings.

22nd, 23rd and 24th (Wed., Thurs. and Fri.). B.V.A. Committee and Council Meetings in London.

February

7th (Fri.). Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 9 p.m.

FOOT-AND-MOUTH DISEASE

The areas described in the Schedules below are declared to be Infected Areas for the purpose of preventing the spread of foot-and-mouth disease:—

The City and County Borough of Canterbury.

IN THE COUNTY OF KENT

The Boroughs of Deal, Dover, Folkestone, Hythe, Margate, Ramsgate and Sandwich.

The Petty Sessional Divisions of Thanet and Wingham and Sandwich.

In the Petty Sessional Division of St. Augustine: The parishes of Chislet, Hoath, Westbere, Fordwich, Sturry, Hackington, Thanington Without, Petham, Waltham, Upper Hardres, Lower Hardres, Bridge, Patrixbourne, Bekesbourne, Chartham and Harbledown.

In the Petty Sessional Division of Hythe and Romney Marsh: The parishes of Stelling, Elmsted, Stelling Minnis, Stowting, Lyminge, Elham, Acrise, Paddlesworth, Hawkinge, Newington, Monks Horton, Postling, Stanford and Saltwood.

The County Borough of Rochdale.

IN THE COUNTY OF LANCASTER

The Boroughs of Haslingden, Heywood, Middleton and Rawtenstall.

In the Petty Sessional Division of Bury: So much of the parish of Ramsbottom as lies to the east of the main road (A56) running from Rawtenstall to Bury, including the said road.

IN THE COUNTY OF WILTS

The Boroughs of Calne, Chippenham and Devizes.

The Petty Sessional Divisions of Calne, Melksham Whorwellsdown and Trowbridge.

In the Petty Sessional Division of Chippenham: The parishes of Christian Malford, Sutton Benger, Stanton St. Quintin, Kington Langley, Kington St. Michael, Yatton Keynell, Castle Combe, Colerne, Biddestone, Box, Corsham, Lacock, Pewsham, Langley Burrell Without and Chippenham Without.

In the Petty Sessional Division of Bradford: The parishes of Monkton Farleigh, South Wraxall, Atworth, Broughton Gifford, Holt and Bradford-on-Avon.

In the Petty Sessional Divison of Westbury: The parishes of Heywood and Bratton.

In the Petty Sessional Division of Devizes.: The parishes of Bromham, Rowde, Roundway, Bishops Cannings, Allcannings, Stanton St. Bernard, Seend, Poulshot, Potterne, Etchilhampton, Patney, Beechingstoke, Marden, Chirton, Stert, Urchfont, Worton, Marston, Erlestoke, Cheverell Magna, Cheverell Parva, West Lavington, Market Lavington and Easterton.

In the Petty Sessional Division of Marlborough: The parishes of East Kennett and Avebury and so much of the parishes of Winterbourne Bassett, Berwick Bassett and Winterbourne Monkton as lies to the west of the main road (A361) running from Wroughton to Avebury including the said road.

In the Petty Sessional Division of Cricklade: The parishes of Clyffe Pypard and Lyneham.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Ches. Marsh Green Farm, Elworth, Sandbach (Dec. 6).

Co. Durham. Whitworth Farm, Heighington, Darlington (Dec. 2).

Dumfries. Bogg Farm, Penpont, Thornhill (Dec. 2).

Lanarks. Wellgreen Farm, Glassford, Strathaven (Dec. 2).

Leics. Clipston Grange Farm, Clipston, Market Harborough (Dec. 4).

Fowl Pest

Herts. Tring Grange Farm, Cholesbury Road, Tring (Dec. 2).

Kent. Tree Farm, Chequer Tree Farm, Cranbrook (Dec. 4).

Lancs. Lydiate Farm, Lydiate Lane, Eccleston, Chorley; 61, Chapel Road, Hesketh Bank, Preston; 262, Leyland Lane, Leyland, Preston; Penside Allotments, Farington, Preston (Dec. 2); Penside Allotments, Farington, Preston; Allandale, Shirley Lane, Longton, Preston (Dec. 3); Ghyll View Farm, Gill Lane, Longton, Preston; Oaklands Poultry Farm, Ulnes Walton, Preston; Beacon House Farm, Dalton, Parbold, Wigan (Dec. 4); Rigbys Farm, Ulnes Walton, Preston; Johnson House Farm, Ulnes Walton, Preston (Dec. 5); Bullens Farm, Ulnes Walton, Preston; Hodgson Farm, Forton, Preston; Pompien Brow Farm, Bretherton, Preston; Hollybank, Southport Road, Ulnes Walton, Preston; Sibbering Farm, Back Lane, Charnock Richard, Chorley; Thompsons Farm, Tannersmith Lane, Mawdsley, Ormskirk (Dec. 6); Oldfields Poultry Farm, Croston, Preston; Brook Farm, Hillylaid Road, Thornton, Cleveleys, Blackpool; White Hill Farm, Whittle-le-Woods, Chorley (Dec. 7); Harrisons Farm, Ulnes Walton, Preston; Barbers Moor Farm, Moor Road, Croston, Preston; 88, Preston Road, Whittle-le-Woods, Chorley; Starling Farm, Hillylaid Road, Thornton Cleveleys, Blackpool (Dec. 8).

Suffolk. Shackland Hall, Badwell Ash, Bury St. Edmunds (Dec. 3); The Stores, Barningham, Bury St. Edmunds; 8, Hepworth Road, Barningham, Bury St. Edmunds (Dec. 7).

Swine Fever

Anglesey. Cechle Farm, Llanfaes, Beaumaris; The Weir, Llanfaes, Beaumaris (Dec. 4).

Berks. Pear Tree Cottage, Pear Tree Lane, Shaw, Newbury (Dec. 4).

Cheshire. Moor Farm, Shocklach, Malpas (Dec. 3).

Derbys. Bridge Farm, Swarkestone (Dec. 3).

Dorset. Peckons Hill Farm, Ludwell, Shaftesbury (Dec. 2).

Hants. Shamblehurst Farm, Shamblehurst Lane, Botley, Southampton (Dec. 6).

Somerset. Mill House, St. Catherines, Batheaston, Bath (Dec. 2); Dry Arch, Warminster Road, Bathampton, Bath (Dec. 4).

Staff. Bantons Lane, Seisdon, Wolverhampton (Dec. 3).

Suffolk. Green Road Piggeries, Haughley, Stowmarket; Mill Farm, Gislingham, Eye (Dec. 5).

Surrey. Brook Farm, Hook Road, Surbiton (Dec. 2).

Sussex. Gatehouse Farm, Goddards Green, Hurstpierpoint, Hassocks (Dec. 6).

Warwicks. Onley Fields Farm, Barby, Rugby (Dec. 4).

Wilts. Paineshill Farm, Donhead St. Andrew (Dec. 5).

Worcs. Lower Barn Farm, Abbots Morton, Inkberrow (Dec. 6).

Yorks. The Chestnuts, Highfield, Bubwith, Selby; Dunn's Premises, Main Street, Bubwith, Selby (Dec. 3); Vine Farm, Bubwith, Selby; Premises at Church Farm, Bubwith, Selby; 44, Southfields Lane, Horbury, Wakefield (Dec. 6).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Direct Mail Advertising

Sir,—My waste-paper-basket groans with the weight of paper which, though not printed by the Bank of England, still represents money which should be in my bank.

For how much longer are we to be snowed under by advertisement material which arrives by every post? This unwelcome attention must cost the firms concerned a very great deal of money and there can be no possible doubt from where it must come. The amount spent by the profession every year on drugs and biologicals must be quite fabulous and though few of us have any way of telling whether we are being charged a fair price, anyone can tell where at least some of the cost is going. What is the sense in a perfectly satisfied user of drug X being cajoled to buy drug X and being told time and time again that drug X is the only one of its kind that he should use? Could there not be some small degree of liaison between the advertising and sales departments at least of the larger firms?

Of all the quantity of advertising material that arrives at my home, I suppose that 98 per cent. refers to drugs, etc., that I either use or at least know all about. Of the remaining 2 per cent., some may be set aside (if my temper that morning is a little less foul than usual) and may eventually be read, but probably only 0.1 per cent. arouses any interest. That interest is fully satisfied by the firm's representative the next time he calls—as it would have been anyway if I had not already read about it!

I wonder whether these drug firms realise that in my case as least, and probably in the majority of others, the most attention that their expensive propaganda receives is to have the envelope ripped open to disclose the heading before its consignment to the waste-bin.

This morning I received an advertisement from a firm producing a well-known and very useful material indicating how they were intending to advertise it to the public. I suppose that the next thing will be an advertisement to the public telling them how they are advertising to the profession the way that they are advertising to the public. Will it never end?

Yours faithfully,
L. W. FULLER.

Braeside,
Dulverton,
Somerset.

December 2nd, 1957.

Pyometra in Bats

Sir,—The many letters of enquiry following the publication of a paper on "The Use of Quinine in the Treatment of Pyometra in the Bitch" by Robert W. Muir and myself (*Vet. Rec.* **69.** 772), prompts

me to reply through the courtesy of your columns regarding the treatment of the same disease in bats. We have treated 9 cases of pyometra in bats during the last 5 years with quinine sulphate; the result has been a 100 per cent. recovery rate as was the case in the bitch. The dosage given was 1 to 2 g. daily.

Yours faithfully,
R. STEPHEN COWIE.

107-9, Moss Street,
Keith,
Banffshire.

November 25th, 1957.

The Space Dog

Sir,—That anyone so eminent and respected in the profession as Mr. Hamilton Kirk could propose the devilry of substituting a man for the sputnik's dog leaves me aghast!

The Russians are not alone in this field. The whole world indulges. In America white mice and rhesus monkeys have been fired in rockets to great heights, all have returned—a few alive. At Montebello the British exposed animals to the effects of our A-bomb. A few million animals pass through the experimental and research laboratories of the world every year, and the number grows. Of more relevance to us is the fact that, each day, cows, sheep, and pigs are conveyed to slaughter-houses and abattoirs—and they have no Pavlovian pre-conditioning to curb their anguish and apprehension. Is " Little Lemon " paramount to all these?

It is of no consequence whether we, as veterinarians, can see the immediate or subsequent utilisation of the results obtained from this experiment. Who could, at the time, have realised the value or have seen the sequelae of the Curies reducing a number of tons of pitchblende to a few grains of radium? Or Louis Pasteur's investigation into the fermentation of beet wine.

I feel it will be a very sorry day when man does lay down his life for a dog.

Yours faithfully,
GEO A. SMITH.

C/o 96, Ridge Road,
Hornsey,
London, N.8.

December 4th, 1957.

Sir,—It is a pleasure to find that my old friend Hamilton Kirk still has a kick to defend any act of cruelty to an animal; and from what I have heard, and believe, the reason for so little comment on that damnably outrageous act on a defenceless creature is because people are stunned by it. It is regarded as being so diabolical that even a Communist would revolt at taking part in it.

It may sound fantastic to say that I am disposed to believe that God turned people loose many years ago to go their own way during life; but the Day of Reckoning is certain to be very painful for those of evil intent. My friends know that I am just an ordinary " John Citizen " and enjoy life. Yet I have had the strange experience that a person who had never seen or heard of me until the moment of meeting told me that that I would not go on a journey I was just about to undertake, and also gave me a message from a cousin who died suddenly three months ago, and who lived about 10,000 miles distant. It makes one think. Two more instances even more remarkable emphasise the fact that there is a life beyond our present one.

Yours faithfully,
R. F. WALL.

The Willows Bungalow,
Maidenhead Road,
Windsor,
Berks.

December 2nd, 1957.

The " Rights " of Animals

Sir,—The controversy over this question has, I feel, caused many of us to think of other and much greater issues. Correspondents have called to their aid observations made by great men of the past in an attempt to bring new light to the present. But with respect to Dryden, Plato, Aristotle, Buddha, and the others, one finds that few writers have sought enlightenment from a source, to me at least, far above all these—the Bible.

The Christian believer, although he has no scientific proof of the life hereafter, has nevertheless faith in the revelation of God to man—the Scriptures. In the latter one reads that God created man in His Own image and therefore different from the other creation. He had communion with man but not with the animals.

I often wonder why men refuse to believe the story of the Creation when Christ believed it. I also wonder why no new creation, since man, has appeared.

Then comes the story of man's disobedience leading to the loss of fellowship with God. There is no reference in this revelation to any animal disobeying God's command or any statement that dogs or oxen possess souls which live on after physical death. The whole Bible story is one of God's love for man and of His plan of redemption.

My plea is that men should study this wonderful library—the Bible—and direct their lives by its teachings. In so doing they would be much better fitted to speak about things spiritual, and these lesser —and perhaps somewhat irrelevant—matters would solve themselves. I should like to commend the letter by Dr. Tom Hare which I feel put the answer in a nutshell. May I end with two statements? A great scientist wrote: " Science has proof but no certainty; religion has certainty but no proof." Christ said: " Because I live, ye shall live also."

Yours faithfully,
W. H. McFERRAN.

Glastry House,
Ballyhalbert,
Co. Down.

December 6th, 1957

IN A LIGHTER VEIN

" Willy-nilly "

Sir,—Let me hasten to correct an impression that my last letter may well have left on the student mind. The last phrase, " willy-nilly, in the profession " should have ended in the word " procession." This one word alters the whole meaning.

For any member to suggest that we all arrive, willy-nilly, in the profession is to stretch the principle of predestination too far. Many have indulged in this brand of wishful thinking, with inevitable consequences. I recall one first-year student who assured us all: " Why bother to swot, why work, why worry? We are all going to be pushed through; they need the money." By " they " he meant the " Dick College " authorities and the Examining Council of the R.C.V.S.; and " the money " was our miserable Class and Examination Fees.

Such was the comfort of his assurance that it occurred to no one to point out that, if they needed the money so badly, their obvious policy should be to keep us there as long as possible.

That student, and several who shared his confidence, repeatedly flung down their examination fee of one guinea, with the patronising air of duchesses at a " sale of work " in aid of a Home for Indigent Gentlemen. After several hilarious distributions of largess they were certainly pushed—not through, but out. Such is the ingratitude of Professors and Examiners.

Let me, Sir, be the means of bringing no such comfort to the student mind. Predestination may well operate in many spheres of life, but there is no evidence of its operation in the Councils of the Royal College. Let any student who aspires to join us discard any soothing illusion on this point that the misprint in my letter may have given.

Yours faithfully,
DONALD BAIN.

The Bungalow,
Oldmeldrum Road,
Newmachar,
Aberdeenshire.

November 30th, 1957.

"A Suitable Legend"

Sir,—On looking at the price list of a well-known firm of druggists, it appears that a certain brand of antiseptic dusting powder is offered in 6-dozen lots with the veterinary surgeon's name and address printed, together with a " suitable legend."

I wonder if we are about to be treated to a full-scale attack of American-type sales pressure à la breakfast cereal variety by the veterinary medical suppliers.

Those of us who are family men can now look forward to having to satisfy the demands of our offspring. We shall be coerced into ordering Tommy Tolid or Cecelia Cetavlon in greater abundance than we normally can use in order that the young may follow the next adventure of their favourite medicimental hero. Worse may follow. We shall probably find ourselves quite unable to cope with the many whims and fancies of our (by then) capricious clientele. We shall be faced with the awful decision of having to assess the treatment of each case according to whether the client is a Peter Penicillin fan or an ardent follower of Bertie Burcillin.

There is, however, great danger in this type of sales pursuit for the manufacturers and suppliers, and here I would like to add a friendly word of warning. While they may initially boost sales such a state cannot continue for long. Competition will grow. The gravest danger lies in the possible fall from grace of their particular type of adventurous little characters. Then we will hear some disgruntled and thoughtless person refer to Bertie as " That little squirt " or even ungraciously accusing Cecelia of being " somewhat soapy." With this inherent danger in the whole scheme of things I think we may safely take comfort in that well-proved motto—" Don't worry! It may never happen."

Yours faithfully,
A. McGUINNESS.

P.S.—Some day I may attempt a serious communication, in which case the profession can take comfort from the same motto.

Glenmore House,
Minehead,
Somerset.

November 26th, 1957.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th November, 1957		13	1	8	72	—	43
Corresponding period in	1956	14	—	7	70	—	17
	1955	57	—	—	49	—	50
	1954	23	—	—	29	—	49
1st January to 15th November, 1957		290	8	125	816	.	852
Corresponding period in	1956	1,197	11	135	673	—	667
	1955	687	6	6	514	—	1,274
	1954	280	4	12	659	—	1,294